

CLAIMS

1. A wireless communication network including push-to-talk (PTT) functionality, comprising:
  - a Session Initiation Protocol (SIP) Proxy Server;
  - a SIP Registrar and Location Server operable to store contact addresses of active mobile devices;
  - a PTT Server operable to function as a call endpoint for each of a plurality of mobile devices wherein the plurality of mobile devices are segmented into membership groups, the PTT Server further operable to multicast a communication from one member of the group to the other members of the group; and
  - an Internet Protocol (IP) network interconnecting the SIP Proxy server, the SIP Registrar and Location Server, and the PTT Server.
2. The network of claim 1 wherein the PTT server includes a signaling plane component and a media plane component
3. The network of claim 1, further including:
  - a Subscriber Database operable to store subscriber data.
4. The network of claim 1, further including:
  - a radio access network operable to wirelessly link the plurality of mobile devices to the IP network.
5. A method for user activation of push-to-talk (PTT) service in a wireless communication network, comprising:
  - initiating a session with a PTT Server wherein a user joins a group;
  - registering a contact for the user;
  - wherein the contact for the user is the PTT Server.
6. The method of claim 5 wherein the group is closed with pre-provisioned members.

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7. The method of claim 5 wherein the group is open whereby any user can join.
8. The method of claim 5 wherein initiating a session includes invoking a SIP INVITE process.
9. The method of claim 8 wherein a To header of the SIP INVITE includes a group specific Uniform Resource Locator.
10. The method of claim 5 wherein registering a contact for the user includes invoking a SIP REGISTER process.
11. The method of claim 5 wherein registering a contact for the user includes registering a group specific Uniform Resource Locator.
12. The method of claim 5 wherein the PTT Server functions as a SIP user agent server and as a multicast router.
13. The method of claim 5 wherein the contact for the user is a SIP URL for the group in the PTT Server.
14. The method of claim 5, wherein initiating a session with the PTT Server includes the PTT Server adding the IP address of the user's mobile device to a multicast group.
15. A method for push-to-talk (PTT) group calls for users in a wireless communication network, comprising:
  - pressing a PTT button on a mobile device;
  - transmitting a SIP SUBSCRIBE to the PTT Server from the mobile device to request the group's speech token;
  - receiving an acknowledge message at the mobile device from the PTT Server wherein the acknowledge message includes a speech token;
  - transmitting a half-duplex speech communication from the mobile device to the PTT Server;

multicasting the half-duplex speech communication from the PTT Server to other members of a group;

releasing the PTT button on the mobile device;

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transmitting a SIP SUBSCRIBE to the PTT Server to release the
speech token;

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notifying the group members that the speech token is available.

16. The method of claim 15 wherein the multicasting includes use of a Class D Multicast address.

17. The method of claim 15 wherein the multicasting includes use of network address and port translation by the PTT server, whereby the PTT server replaces a destination IP address of a port number of received speech packets with an IP address of a port number of each target user and unicasts modified packets to each target user.

18. The method of claim 15 further including authorizing priority members to pre-empt any other group member who has been granted the speech token.

19. The method of claim 15 further including identifying the caller to target users.

20. The method of claim 19 wherein SIP INFO and NOTIFY messages are used to convey a calling party ID.

21. The method of claim 15, wherein notifying the group members that the speech token is available includes sending a SIP INFO message indicating the speech token is available.

22. The method of claim 15, wherein notifying the group members that the speech token is available includes sending a SIP NOTIFY message indicating the speech token is available.

24. The method of claim 15, wherein notifying the group members that the speech token is available includes multicasting to group members a pre-stored tone from the PTT Server.

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    queuing the request for the speech token until the speech
token is available;
    processing the queued request to acquire the speech token when
the speech token becomes available.

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selecting a called party private identification for a private call by a calling party on a mobile device;

transmitting a SIP SUBSCRIBE including the calling and called parties private identifications to request a speech token;

receiving an acknowledge message that includes a speech token;

communicating speech packets from the calling party to the  
d party in a half-duplex manner;

transmitting a SIP SUBSCRIBE to release the speech token;

27. The method of claim 26 wherein the transmitting the calling party information uses a SIP NOTIFY message.

29. The method of claim 26 wherein notifying the calling party that the group's speech token is available includes sending a response to the SIP SUBSCRIBE that requested releasing of the private-call speech token.

31. The method of claim 26 wherein notifying the called party that the group's speech token is available includes sending a SIP NOTIFY.

33. The method of claim 26 further including:  
reinstating the calling party and the called party as part of  
the group upon termination of the private call.

34. The method of claim 33 wherein reinstating the calling and called party as part of the group includes restoring the IP addresses of the parties' mobile devices to the group's multicast group.

35. A method for PTT group calls in a wireless communication network where a plurality of users are registered as members of a multicast group, comprising:

requesting a speech token from a PTT Server by pressing a PTT button on a mobile device;  
receiving the speech token at the mobile device;  
transmitting a half duplex communication to the PTT Server;  
multicasting the half duplex communication from the PTT Server to other members of the group;  
releasing the speech token by releasing the PTT button;  
sending a speech token available message from the PTT Server to all registered members of the multicast group.

36. A method for PTT private calls for users in a wireless communication network where the users are registered as members of a multicast group, comprising:

entering a called party private identification for a private call by a calling party on a mobile device;  
transmitting the calling and called parties' private identifications by pressing a PTT button on the mobile device;  
redirecting the called party private identification to a PTT Server, the RPTMG operable to temporarily remove the calling party and the called party from the multicast group;  
transmitting calling party information to the called party from the PTT Server;  
communicating directly from the calling party and the called party.

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